

## ABSTRACT

In general, the present invention is directed to systems and methods for

5 finding the position and shape of an object using video. The invention includes a system with a video camera coupled to a computer in which the computer is configured to automatically provide object segmentation and identification, object motion tracking (for moving objects), object position classification, and behavior identification. In a preferred embodiment, the present invention may use

10 background subtraction for object identification and tracking, probabilistic approach with expectation-maximization for tracking the motion detection and object classification, and decision tree classification for behavior identification.

Thus, the present invention is capable of automatically monitoring a video image to identify, track and classify the actions of various objects and the object's

15 movements within the image. The image may be provided in real time or from storage. The invention is particularly useful for monitoring and classifying animal behavior for testing drugs and genetic mutations, but may be used in any of a number of other surveillance applications.